

**Species:** *Aliciella penstemonoides* (M.E. Jones) J.M. Porter

Synonyms – *Gilia penstemonoides* M.E. Jones

Common names – Black Canyon gilia

**Status:** Table 1 summarizes the current status of this plant by various ranking entities and defines the meaning of the status.

Table 1. Current status of <i>Aliciella penstemonoides</i>		
Entity	Status	Status Definition
NatureServe	G3	G3—Globally vulnerable - Vulnerable either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation or extinction. Typically 21 to 100 occurrences or between 3,000 and 10,000 remaining individuals.
Colorado Natural Heritage Program (CNHP)	S3	S3 – State vulnerable - Vulnerable either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation or extinction. Typically 21 to 100 occurrences or between 3,000 and 10,000 remaining individuals.
USDA Forest Service	None	
USDI Fish and Wildlife Service	Not listed	Not federally recognized under the Endangered Species Act (ESA) as endangered, threatened, proposed, or candidate species.

The 2012 U.S. Forest Service Planning Rule defines Species of Conservation Concern (SCC) as “a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area” (36 CFR 219.9). This overview was developed to summarize information relating to this species' consideration to be listed as a SCC on the Rio Grande National Forest, and to aid in the development of plan components and monitoring objectives.

**Distribution, abundance, and population trend on the planning unit:**

*Aliciella penstemonoides* is a Colorado endemic, known only from a small area in Colorado. NatureServe (2015) reports that it is found in Montrose, Gunnison, Hinsdale and Mineral Counties in Colorado. According to the 2015 CNHP data, it has also been found in Ouray County.

There are six CNHP element occurrence reports of *Aliciella penstemonoides* in the planning area and an additional 17 occurrence reports in Colorado, outside the planning area (CNHP 2015).

The G3S3 status of the species is indicative of its restricted range. The occurrence records state that most sites had over 100 individuals, but some sites were smaller, with one recording only 10 individuals. Beatty and others (2004) noted that *Aliciella penstemonoides* occurrences across Colorado range from three individuals to thousands of individuals. There are no data on population trends, but occurrence records of revisited populations indicate that some populations have remained the same, some have increased, and some no longer exist (Beatty et al. 2004).

**USFS Corporate Database Habitat Type Associated with the Species:**

*Aliciella penstemonoides* grows in crevices, on narrow ledges, and on rimrock of vertical or near-vertical canyon walls. The occurrence records for the occurrences within the planning area describe the habitat as “rhyolitic cliffs”, “in small cracks on south facing igneous rock cliff”, and “*Ribes cereum/Brickellia grandiflora* habitat type on southeast/east slope of igneous rock walls” (CNHP 2015). Beatty and others (2004) state the recorded elevations for the species ranges from 6,800 to 10,000 feet.

The occurrences on the RGNF are located in the Engelmann Spruce on Mountain Slopes, Arizona Fescue on Mountain Slopes, and Nonvegetated Areas on Mountain Slopes Land Type Associations. The scale of the LTA mapping is too coarse to determine which LTAs may support this species (RGNF GIS data).

**CNHP Ecological System of the Southern Rocky Mountains Ecoregion:**

It is difficult to identify which CNHP Ecological System the species occurs in, but is known to occur in Rocky Mountain Cliff, Canyon and Massive Bedrock (CNHP 2005).

**Brief description of natural history and key ecological functions:**

*Aliciella penstemonoides* is an herbaceous, perennial, apparently long-lived forb. This species develops a caespitose growth form (grows in low branching pattern) from a much-branching root, with one to several stems 5 to 15 centimeters tall. It produces an inflorescence of showy, conspicuous flowers, often with a strong odor to attract pollinators. There is no reported occurrence of asexual (e.g., vegetative or apomixis) reproduction by this species. The extent of asexual reproduction is unknown.

There have been no studies on the life history, demography, or longevity of *Aliciella penstemonoides* (Beatty et al. 2004).

Grant and Grant (1965, as reported in Beatty et al. 2004) studied pollination biology of the genus and they verified that cross-pollination by insects (e.g., bumblebees, bees) is an important reproductive factor for many species of the genus. The flowers are showy, often have a strong odor, are arranged in loose, cymose inflorescences and produce nectar that collects at the base of the corolla tube (Beatty et al. 2004).

There is little information regarding population parameters or demographic features of *Aliciella penstemonoides*, such as metapopulation dynamics, life span, recruitment, and survival. There have been some observations of percentage fruiting and evidence of young age classes, but there have not been any multi-year demographic studies. No demographic monitoring has been initiated for *Aliciella penstemonoides*. To initiate a population viability analysis for *A. penstemonoides*, the rates of germination, fecundity, survival, and other important parameters require additional study (Beatty et al. 2004).

#### **Overview of ecological conditions for recovery, conservation, and viability:**

Beatty and others (2004) reports that the viability of *Aliciella penstemonoides* within USFS Region 2 is difficult to ascertain because its full distribution and abundance are unknown, demographic parameters have not been studied, and the effects of human activities (i.e., rock-climbing, trail use) have not been studied. Although the number of documented *A. penstemonoides* populations throughout the range is low, populations appear to inhabit largely inaccessible terrain. The long-term viability of *G. penstemonoides* within USFS Region 2 is unknown, but the rangewide vulnerability of this species to imminent destruction appears to be low.

Threats to the long-term persistence of *Aliciella penstemonoides* are mostly unknown because of the lack of species understanding and research. Most populations appear to be naturally protected from direct human impacts by their occupation in highly inaccessible cliff face habitats. However, recreational activities near cliff bases, such as fishing, pack trail use, hiking trail use, or rock climbing could directly or indirectly affect individuals, particularly individuals located in talus areas at cliff bases. The species is likely not threatened by typical USFS land management techniques, such as livestock grazing, timber harvest, thinning, or prescribed fire (Beatty et al. 2004). None of the occurrence records for the occurrences within the planning area identify any threats to the known occurrences (CNHP 2015).

Environmental or biological threats to populations or habitats of *Aliciella penstemonoides* could include non-native species introductions, herbivory, inadequate pollination, genetic isolation, hybridization, global climate change, or other changes to the natural disturbance regime that would affect precipitation or weathering patterns. Existing *A. penstemonoides* individuals could be affected by intense weathering, erosion, or rockfalls. This species is unlikely to be impacted by wildfires or blowdowns. The extent and effects of any herbivory on the long-term persistence of *A. penstemonoides* are unknown. Any increase in non-native species invasion is a future risk for competition with *A. penstemonoides*, especially for populations near trails, roads, and other disturbed areas.

Changes to existing climatic and precipitation patterns, perhaps as a result of global environmental change, could also impact *Aliciella penstemonoides*. In 2011, Climate Change Vulnerability Assessments were conducted for plant species in the Gunnison Basin, utilizing methods developed by Manomet Center for Conservation Science and NatureServe (Neeley et al. 2011). *Aliciella penstemonoides* was assigned a climate vulnerability score of Moderately Vulnerable for the Gunnison Basin. The score was based on the species' restriction to cliffs.

Overall, based on current information, threats to *Aliciella penstemonoides* are considered relatively low. However, this should be tempered with the number of unknowns and the endemism of this species.

**Key ecosystem characteristics and ecological conditions for recovery, conservation, and viability:**

Because *Aliciella penstemonoides* is endemic to Colorado, it is critically important to maintain the known occurrences. Presently, most threats appear to be at a relatively low and manageable level. Global climate change will likely affect all plant communities to an unknown degree over time. How this species will cope with this potential change is unknown, but, as discussed above, the species is assumed to be moderately vulnerable to climate change.

The RGNF should strive to maintain habitat conditions for *Aliciella penstemonoides* by applying suggested management practices as follows:

- 1) Manage habitat - Manage and adjust pressures from any management influences found to be creating unacceptable impacts.
- 2) Manage environmental stressors - Continue assessing the RGNF's contribution to global climate change and adjust actions where permissible within the Forest Service's legal and regulatory authority. Use tools such as the Forest's Climate Change Scorecard to assess impacts and make positive changes where needed.

**Key uncertainties and information needs/gaps:**

Much of the information regarding habitat requirements, establishment, reproduction, dispersal, relationship with herbivores, competition with other species, and overall persistence has not been studied for *Aliciella penstemonoides*. Specific areas of further research identified by Beatty and others (2004) include studying the root zone and substrate environment, identifying the most efficient pollinators, monitoring effects of land use, and studying the effects of spring snowmelt and precipitation on development. The following suggestions are ordered from inventory activities (to determine the current status) to more complex biological studies (to help understand the species):

- Re-visiting and detailed mapping of the known occurrences
- Monitoring population trends
- Surveying for new occurrences
- Identifying any imminent threats to known populations, especially those related to rock-climbing
- Defining and measuring microhabitat characteristics
- Measuring demographic parameters using long-term monitoring plots
- Conducting studies related to reproductive biology, including pollinator surveys, germination, vegetative reproduction, mycorrhizal associations, and seedbank analyses
- Assessing gene flow, genetic variability, and possible hybridization throughout range.

The following is an outline of a monitoring approach that could be used to inform the development of the RGNF Forest Plan revision's monitoring plan. Additionally, areas of research opportunity (beyond the scope of the Forest Plan revision) are suggested below based on key uncertainties about this species.

- 1) **Monitoring:** monitoring priority is a judgment determination based on number of occurrences, potential threats, and conservation status. The priority for this species is thought to be low. This is primarily due to the status of G3S3 (see Table 1), its naturally protected habitat and its endemism. Existing management practices are not known to be causing detrimental impact. Thus, monitoring is suggested as follows:
  - a. Search for and document new species occurrences found on the Forest. Ensure that additional occurrences, as well as negative search results, are recorded in the appropriate electronic database. Additional occurrences increase the odds in the confidence of assessing population viability, especially with greater geographic separation. Finding additional occurrences helps inform whether additional monitoring is needed and at what intensity.
  - b. Monitor known element occurrences to document presence or absence. Evaluate each occurrence based on appropriate database protocols. Visually document the same populations every 5-7 years (twice in a planning cycle). Consider enlisting an organization such as CNHP to help develop a rapid monitoring technique that is meaningful for trend analysis but is easy to establish and simple to evaluate.
  - c. Make visual observations to assess if any impacts are occurring to the known occurrence. Assess the type, source, frequency, and magnitude of the impact. Develop a strategy at the appropriate time for mitigating impacts (eliminate, move, delay, or reduce the impact).
- 2) **Research:**
  - a. Reproductive biology, autecology, and demography - there are many unknowns about this species' life cycle suggesting numerous areas of potential research.
  - b. Genetics - an accurate estimate of this species' genetic vulnerability is unknown.
  - c. Disturbance - there are unknowns about the role and types of disturbance and their possible effects.

#### **Key literature:**

Beatty, B.L., W.F. Jennings, and R.C. Rawlinson (2004, February 9). *Gilia penstemonoides* M.E. Jones (Black Canyon gilia): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/giliapenstemonoides.pdf> [10/19/2015].

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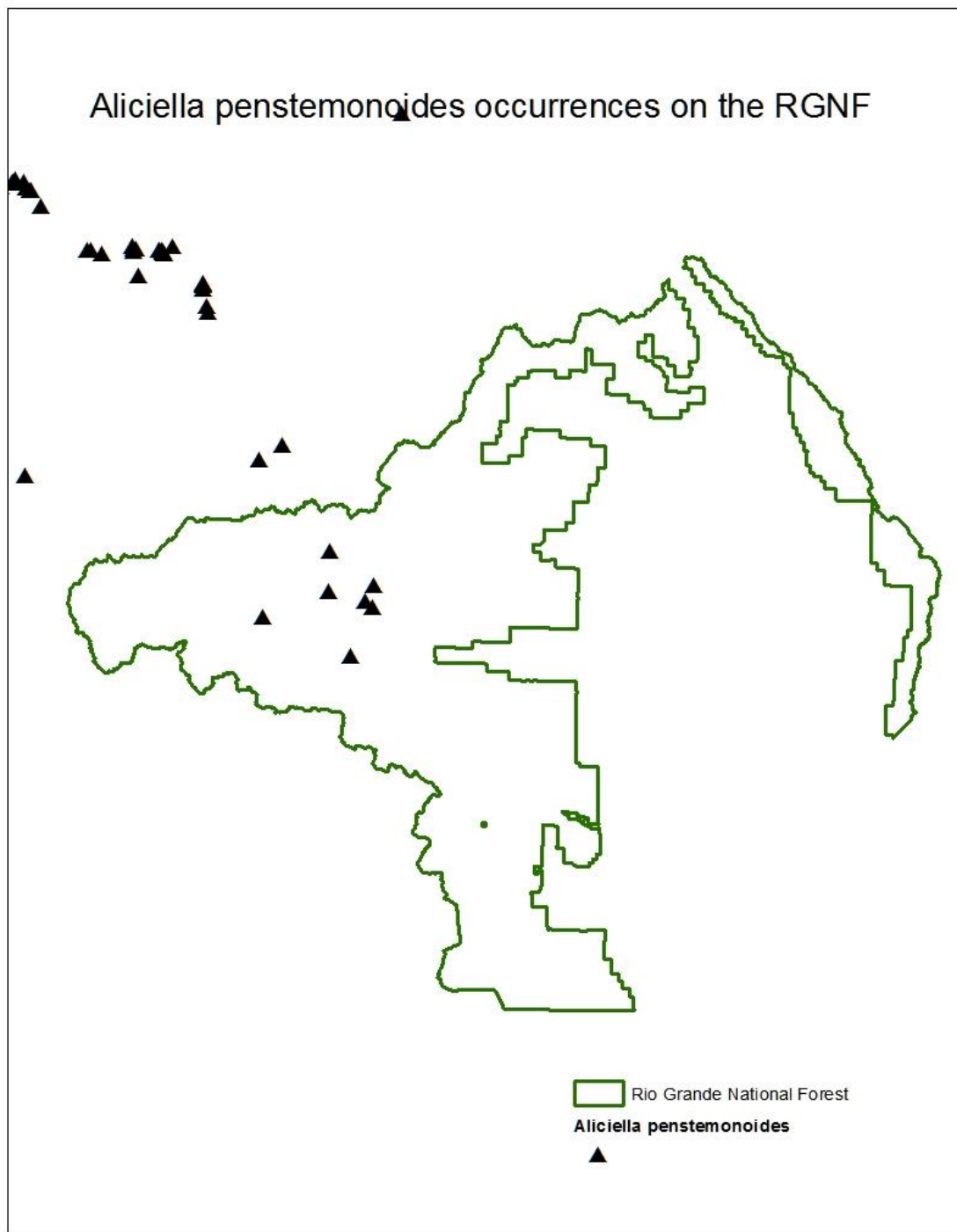
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USDA Natural Resource Conservation Service (NRCS). 2015. The PLANTS Database (<http://plants.usda.gov>, 1 October 2015). National Plant Data Team, Greensboro, NC 27401-4901.

**Map of Known Occurrences:**



**Figure 1.** *Aliciella penstemonoides* on the RGNF.